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Started on	Sunday, 20 October 2024, 6:07 PM
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Grade	**5.00** out of 10.00 (**50**%)

Question 1

ID: 57870

Correct

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The NEXT 4 QUESTIONS INCLUSIVE REFER TO THE FOLLOWING CASE:

TW is a 73-year-old female that presents to your oncology clinic for an initial assessment after a new diagnosis of HER2+ breast cancer. Prior to her diagnosis, TW experienced months of generalized malaise, weakness, and night sweats that led her to seek medical attention. TW works as the chief executive officer for a large media conglomerate and admits to living an extremely stressful and poor lifestyle prior to her diagnosis. This included little sleep and a diet filled with fast food. Since her diagnosis, she has drastically changed her lifestyle to include a well-balanced diet and is now an avid cyclist. TW has no known allergies to medications and her past medical history includes coronary artery disease, osteoarthritis, heart failure with preserved ejection fraction, and chronic kidney disease. Medications on TW's record include atenolol 25 mg PO once daily, acetaminophen 500 mg PO Q4H PRN, topical diclofenac 1.32% applied to both knees PRN and empagliflozin 10 mg PO once daily. In preparation for her clinic visit, she had labs completed at the request of her oncologist which included serum potassium of 3.1 mmol/L (normal: 3.5 – 5.0 mmol/L), estimated glomerular filtration rate of 47 mL/min, and ejection fraction of 65% on her echocardiogram.

The oncologist has recommended the BRAJACTTG protocol (doxorubicin and cyclophosphamide followed by paclitaxel and trastuzumab) with curative intent. Which of the following drugs and associated toxicities is most concerning for TW?

Select one:

- Cyclophosphamide and hemorrhagic cystitis ✖
- Cyclophosphamide and risk of cardiotoxicity ✖
- Doxorubicin and risk of cardiotoxicity ✔

  Rose Wang (ID:113212) this answer is correct. Anthracyclines such as doxorubicin are known to be associated with cardiotoxicities. This may manifest as a temporary or permanent reduction in left ventricular function. Given TW's significant cardiac history including coronary artery disease and heart failure with preserved ejection fraction, anthracycline toxicity is a significant concern for TW and her heart function should be monitored closely with this chemotherapy regimen.
- Paclitaxel and the risk of peripheral neuropathy ✖

Correct

Marks for this submission: 1.00/1.00.

TOPIC: Oncology

LEARNING OBJECTIVE:

To identify which chemotherapy agents are associated with cardiotoxicity.

BACKGROUND:

Classes of chemotherapy such as anthracyclines (e.g. doxorubicin, epirubicin, idarubicin) and agents such as lapatinib and trastuzumab are associated with cardiotoxicity and can result in heart failure. Cardiotoxic effects can be early (acute) or late (delayed). Risk factors for developing anthracycline-induced cardiotoxicity include higher cumulative dose, prior therapy with other anthracyclines, prior or concomitant radiotherapy to the mediastinal/pericardial area, pre-existing heart disease, extremes of age, liver disease, concomitant chemotherapy, and female gender. Signs and symptoms of cardiotoxicity include dyspnea, increased cough, paroxysmal nocturnal dyspnea, peripheral edema, S3 heart sound gallop, congestive heart failure, or a reduced ejection fraction of 10% or greater. Cardiac function should be assessed at baseline and continuously throughout therapy. Early cardiotoxic effects are not dose-related and may present as mild electrocardiogram changes to life-threatening arrhythmias typically during or immediately after a single dose. Early cardiotoxicity does not predict subsequent development of delayed cardiotoxicity and is not considered an indication for suspension of therapy. Late cardiotoxic effects are dose-related and manifest as reduced left ventricular ejection fraction (LVEF), and typically occur weeks to years after the completion of treatment. Management of anthracycline cardiotoxicity includes discontinuation of the drug and initiating standard goal-directed medical therapy for the management of congestive heart failure. Cardiotoxicity has been reported with trastuzumab but cardiac dysfunction is not dose-related and is reported to be highly reversible. Patients generally have a good prognosis following heart failure or left ventricular dysfunction. Left ventricular function usually returns toward baseline during the 1.5 months post-trastuzumab treatment, however, some cases have resulted in debilitating heart failure.

RATIONALE:

Correct Answer:

- **Doxorubicin and risk of cardiotoxicity** - Anthracyclines such as doxorubicin are known to be associated with cardiotoxicities. This may manifest as a temporary or permanent reduction in left ventricular function. Given TW's significant cardiac history including coronary artery disease and heart

failure with preserved ejection fraction, anthracycline toxicity is a significant concern for TW and her heart function should be monitored closely with this chemotherapy regimen.

Incorrect Answers:

- **Cyclophosphamide and hemorrhagic cystitis** - Although cyclophosphamide is associated with the risk of hemorrhagic cystitis, it is not relevant to TW at this time.
- **Cyclophosphamide and risk of cardiotoxicity** - Cyclophosphamide is associated with cardiac dysfunction at high doses but is not a noted common side effect of this therapy relative to other known causative agents such as anthracyclines.
- **Paclitaxel and the risk of peripheral neuropathy** - Although paclitaxel is associated with the risk of peripheral neuropathy, it is not the most relevant consideration for TW who has a significant cardiac history.

TAKEAWAY/KEY POINTS:

The use of anthracyclines (i.e. doxorubicin), trastuzumab, and lapatinib has been associated with cardiotoxicity.

REFERENCE:

[1] BC Cancer Agency. Doxorubicin Monograph. BC Cancer. Published 1994. Updated August 1, 2019. http://www.bccancer.bc.ca/drug-database-site/Drug%20Index/Doxorubicin_monograph.pdf

[2] BC Cancer Agency. Cyclophosphamide Monograph. BC Cancer. Published September 1994. Updated June 2013. http://www.bccancer.bc.ca/drug-database-site/Drug%20Index/Cyclophosphamide_monograph_1June2013_formatted.pdf

[3] Gelmon K. BC Cancer Protocol Summary for Neoadjuvant or Adjuvant Therapy for Breast Cancer Using Dose Dense Therapy: DOXOrubicin and Cyclophosphamide Followed by PACLitaxel and Trastuzumab. BC Cancer Agency. BC Cancer. Published July 2005. Updated Jan 1, 2023. http://www.bccancer.bc.ca/chemotherapy-protocols-site/Documents/Breast/BRAJACTTG_Protocol.pdf

The correct answer is: Doxorubicin and risk of cardiotoxicity

Question 2

ID: 57871

Incorrect

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The medical student on your team looks up the BRAJACTTG protocol (doxorubicin and cyclophosphamide followed by paclitaxel and trastuzumab) and notes that the risk of febrile neutropenia in this regimen is greater than 20%.

What does this mean for TW with regard to the use of granulocyte colony-stimulating factors (G-CSF) in her treatment?

Select one:

- Routine G-CSF primary prophylaxis should be given to this patient ✔
- G-CSF therapy should be provided to TW because it reduces the risk of mortality from infection in patients with febrile neutropenia ✖

  Rose Wang (ID:113212) this answer is incorrect. Granulocyte colony-stimulating factors (G-CSF) have an unclear impact on survival in randomized trials and meta-analyses.
- TW should be admitted to the hospital and treated solely with G-CSF therapy at the first sign of a fever ✖
- Routine G-CSF primary prophylaxis is not indicated ✖

Incorrect

Marks for this submission: 0.00/1.00.

TOPIC: Oncology

LEARNING OBJECTIVE:

To identify when granulocyte colony-stimulating factors (G-CSF) are indicated in patients undergoing chemotherapy.

BACKGROUND:

Myelosuppression can be a common side effect of chemotherapy regimens. Due to their cytotoxic nature, chemotherapies impede the self-renewal and differentiation of bone marrow cells, leading to subsequent neutropenia and anemia. The nadir, the time period when neutrophils deplete to their lowest point post-chemotherapy, is typically within 7 to 10 days of chemotherapy administration. Preventative strategies for febrile neutropenia include measures such as thorough handwashing, maintaining adequate hydration and nutrition, receiving indicated vaccinations, and others. National and international guidelines recommend that primary prophylaxis with granulocyte colony-stimulating factors (G-CSF) are indicated starting with the first treatment cycle when the risk of febrile neutropenia is over 20%.

RATIONALE:

Correct Answer:

- **Routine G-CSF primary prophylaxis should be given to this patient** - Various guidelines recommend primary prophylaxis with granulocyte colony-stimulating factors (G-CSF) when the risk of neutropenic fever is approximately 20% or higher.

Incorrect Answers:

- **G-CSF therapy should be provided to TW because it reduces the risk of mortality from infection in patients with febrile neutropenia** - Granulocyte colony-stimulating factors (G-CSF) have an unclear impact on survival in randomized trials and meta-analyses.
- **TW should be admitted to the hospital and treated solely with G-CSF therapy at the first sign of a fever** - Although granulocyte colony-stimulating factors (G-CSF) may play a role in the management of febrile neutropenia, it is not the only treatment recommended for management.
- **Routine G-CSF primary prophylaxis is not indicated** - Routine granulocyte colony-stimulating factors (G-CSF) is indicated due to the febrile neutropenia risk being over 20%.

TAKEAWAY/KEY POINTS:

Granulocyte colony-stimulating factors (G-CSF) are indicated for primary prophylaxis in patients undergoing chemotherapy with febrile neutropenia risk greater than 20%.

REFERENCE:

[1] BC Cancer Agency. Doxorubicin Monograph. BC Cancer. Published 1994. Updated August 1, 2019. http://www.bccancer.bc.ca/drug-database-site/Drug%20Index/Doxorubicin_monograph.pdf.

[2] BC Cancer Agency. Cyclophosphamide Monograph. BC Cancer. Published September 1994. Updated June 2013. http://www.bccancer.bc.ca/drug-database-site/Drug%20Index/Cyclophosphamide_monograph_1June2013_formatted.pdf.

[3] Gelmon K. BC Cancer Protocol Summary for Neoadjuvant or Adjuvant Therapy for Breast Cancer Using Dose Dense Therapy: DOXOrubicin and Cyclophosphamide Followed by PACLitaxel and Trastuzumab. BC Cancer Agency. BC Cancer. Published July 2005. Updated Jan 1, 2023. http://www.bccancer.bc.ca/chemotherapy-protocols-site/Documents/Breast/BRAJACTTG_Protocol.pdf.

[4] Larson R. Use of granulocyte colony stimulating factors in adult patients with chemotherapy-induced neutropenia and conditions other than acute leukemia, myelodysplastic syndrome, and hematopoietic cell transplantation. UpToDate. Updated September 28, 2022. https://www.uptodate.com/contents/use-of-granulocyte-colony-stimulating-factors-in-adult-patients-with-chemotherapy-induced-neutropenia-and-conditions-other-than-acute-leukemia-myelodysplastic-syndrome-and-hematopoietic-cell-transplantation.

The correct answer is: Routine G-CSF primary prophylaxis should be given to this patient

Question 3

ID: 57872

Correct

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After multiple cycles of the BRAJACTTG protocol (doxorubicin and cyclophosphamide followed by paclitaxel and trastuzumab), TW's ejection fraction has decreased to 35% but she remains asymptomatic. TW is aware of the risks of continuing therapy and insists on doing so. The physician agrees to continue and asks you for your opinion on how to optimize TW's medications.

What is your advice to the physician?

Select one:

- Discontinue the current chemotherapy regimen and recommend a different regimen ✖
- Recommend the addition of furosemide 20 mg PO QAM ✖
- Recommend switching from atenolol 50 mg PO once daily to propranolol IR 40 mg PO BID ✖
- Recommend the addition of ramipril 2.5 mg PO once daily ✔

Rose Wang (ID:113212) this answer is correct. The addition of an angiotensin-converting enzyme inhibitor (ACEi) such as ramipril is part of goal-directed medical therapy and management of heart failure with reduced ejection fraction.

Correct

Marks for this submission: 1.00/1.00.

TOPIC: Oncology

LEARNING OBJECTIVE:

To understand the management of chemotherapy-induced heart failure.

BACKGROUND:

Classes of chemotherapy such as anthracyclines (e.g. doxorubicin, epirubicin, idarubicin) and agents such as lapatinib and trastuzumab are associated with cardiotoxicities and can result in heart failure. Symptomatic heart failure may present differently in patients but symptoms typically include any combination of fatigue, weakness, shortness of breath with activity or at rest, swelling in the legs, ankles, or feet, wheezing, swelling of the belly area, nausea and lack of appetite. Heart failure with reduced ejection fraction (HFrEF) is normally managed with goal-directed medical therapy which includes treatment with a beta blocker (BB), mineralocorticoid receptor antagonist (MRA), sodium glucose cotransporter-2 inhibitor (SGLT2i) and an angiotensin-converting enzyme inhibitor (ACEi) or angiotensin-receptor blocker (ARB), or angiotensin receptor/neprilysin inhibitor (ARNI). Management of cardiotoxicity secondary to chemotherapy includes discontinuation of the drug when appropriate and initiation of goal-directed medical therapy.

RATIONALE:

Correct Answer:

- **Recommend the addition of ramipril 2.5 mg PO once daily** - The addition of an angiotensin-

converting enzyme inhibitor (ACEi) such as ramipril is part of goal-directed medical therapy and management of heart failure with reduced ejection fraction.

Incorrect Answers:

- **Discontinue the current chemotherapy regimen and recommend a different regimen** - TW has stated that they wish to continue with therapy and accept the current risks. The physician has agreed to continue with therapy.
- **Recommend the addition of furosemide 20 mg PO QAM** - TW is asymptomatic and the addition of furosemide will not provide any left ventricular enhancement or mortality benefit for the patient.
- **Recommend switching from atenolol 50 mg PO once daily to propranolol IR 40 mg PO BID** - Propranolol does not have a proven mortality benefit for patients with heart failure with reduced ejection fraction and is not a recommended beta blocker.

TAKEAWAY/KEY POINTS:

Management of chemotherapy-induced cardiotoxicity includes discontinuation of the drug when appropriate and initiation of standard heart failure treatment.

REFERENCE:

[1] BC Cancer Agency. Doxorubicin Monograph. BC Cancer. Published 1994. Updated August 1, 2019. http://www.bccancer.bc.ca/drug-database-site/Drug%20Index/Doxorubicin_monograph.pdf.

[2] Armenian SH, Lacchetti C, Barac A, et al. Preventing and Monitoring of Cardiac Dysfunction in Survivors of Adult Cancers; American Society of Clinical Oncology Clinical Practice Guideline. *Journal of Clinical Oncology.* 2017; 35(8). 893-911. doi:10.1200/JCO.2016.70.5400

[3] Ezekowitz JA, O'Meara E, McDonald MA, et al. 2017 Comprehensive update of the Canadian Cardiovascular Society Guidelines for the Management of Heart Failure. *Can J Cardiol.* 2017; 33(11): 1342-1433. doi: 10.1016/j.cjca.2017.08.022

The correct answer is:
Recommend the addition of ramipril 2.5 mg PO once daily

Question 4

ID: 57873

Correct

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After TW's most recent cycle of chemotherapy, you notice that she looks quite sickly. Upon further investigation, you discover that she has been experiencing chills with a persistent fever > 38.3 degrees Celsius for the past 24 hours and her blood pressure in the clinic is 89/50 mmHg.

What is your course of action?

Select one:

- Provide TW with acetaminophen and continue the clinic visit as scheduled ✖
- Recommend that TW immediately goes to the ER for amoxicillin 500 mg PO BID ✖
- Recommend that TW immediately goes to the ER for cefazolin 2 G IV Q8H ✖
- Recommend that TW immediately goes to the ER for piperacillin-tazobactam 3.375 G IV Q6H ✔

Rose Wang (ID:113212) this answer is correct. Broad-spectrum antibiotics are recommended as febrile neutropenia is an oncologic and medical emergency with high mortality if untreated.

Correct

Marks for this submission: 1.00/1.00.

TOPIC: Oncology

LEARNING OBJECTIVE:

To understand the initial management of febrile neutropenia.

BACKGROUND:

Febrile neutropenia occurs when a patient has a fever and a significant reduction in a type of white blood cell called neutrophils which are needed to fight against infection. Many patients undergoing chemotherapy will experience a reduction in their white blood cells either temporarily or persistently as a consequence of their treatment, increasing their risk of infection. Neutropenia itself may not cause any symptoms. Patients usually find out that they have neutropenia from a blood test or when they get an infection. Some people will feel more tired when they have neutropenia. Due to a muted immune response, fever may be the only sign of invasive infection in neutropenic patients. Other symptoms may include sore throat, swollen lymph nodes, ulcers in the mouth, or diarrhea. Based on a patient's clinical status, the responsible physician will determine if the patient should be admitted to a healthcare facility for observation and treatment or if the patient can be treated at home. Red flag signs for adults with febrile neutropenia include an oral temperature greater than or equal to 38.3 degrees Celsius (or greater than or equal to 38.0 degrees Celsius for more than 1 hour) and absolute neutrophil count (ANC) less than 0.5 x 10^9 (or less than 1 x 10^9/L with expected further decline). Febrile neutropenia is a medical emergency and should be managed initially with broad-spectrum antibiotics.

RATIONALE:

Correct Answer:

- **Broad-spectrum antibiotics are recommended as febrile neutropenia is a medical emergency with high mortality if untreated** - Broad-spectrum antibiotics are recommended as febrile

With high mortality if untreated. - Broad-spectrum antibiotics are recommended as febrile neutropenia is a medical emergency with high mortality if untreated.

Incorrect Answers:

- **TW is experiencing febrile neutropenia with signs of hemodynamic instability. TW needs immediate medical attention.** - TW is experiencing febrile neutropenia with signs of hemodynamic instability. TW needs immediate medical attention.
- **Oral antibiotics with a limited spectrum of activity such as amoxicillin are not effective or indicated in the early management of febrile neutropenia.** - Oral antibiotics with a limited spectrum of activity such as amoxicillin are not effective or indicated in the early management of febrile neutropenia.
- **Cefazolin does not provide broad spectrum coverage relative to other antimicrobial options available and would not be the preferred choice in febrile neutropenia.** - Cefazolin does not provide broad spectrum coverage relative to other antimicrobial options available and would not be the preferred choice in febrile neutropenia.

TAKEAWAY/KEY POINTS:

Febrile neutropenia is a medical emergency and should be managed initially with broad-spectrum antibiotics.

REFERENCE:

[1] BC Cancer Agency. Febrile Neutropenia Assessment And Treatment for Adults With Solid Tumour And Lymphoma. BC Cancer. Published March 26, 2015. Updated December 16, 2022. http://shop.healthcarebc.ca/phsa/BCCancer/Provincial%20Pharmacy/70568.pdf.

The correct answer is:
Recommend that TW immediately goes to the ER for piperacillin-tazobactam 3.375 G IV Q6H

Question 5

ID: 57875

Incorrect

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The NEXT 3 QUESTIONS INCLUSIVE REFER TO THE FOLLOWING CASE:

LR is a 50-year-old male with a new diagnosis of metastatic colorectal cancer who presents to your outpatient clinic for an initial interdisciplinary assessment. Prior to his diagnosis, LR was a full-time personal trainer who maintained a very physically active lifestyle. Upon reviewing his chart, you note that LR has had limited contact with the health care system with his last family physician consult nearly 15 years ago. His past medical history includes type 2 diabetes mellitus, Child-Pugh class A liver cirrhosis, and irritable bowel syndrome. The only medications you note on LR's file are metformin 500 mg PO BID and psyllium 3 g once daily. The oncologist has recommended the GIFOLFOX protocol (oxaliplatin, 5-fluorouracil, and folinic acid) with palliative intent.

All of the following are noted common side effects of 5-fluorouracil **EXCEPT:**

Select one:

- Diarrhea ✖ *Rose Wang (ID:113212) this answer is incorrect. Diarrhea is a known common side effect of 5-fluorouracil.*
- Stomatitis ✖
- Alopecia ✖
- Hepatic toxicity ✔

Incorrect

Marks for this submission: 0.00/1.00.

TOPIC: Oncology

LEARNING OBJECTIVE:

To identify the common side effects of 5-fluorouracil.

BACKGROUND:

5-fluorouracil is a chemotherapy agent primarily used for bladder, breast, colorectal, gastric, pancreatic, prostate, and skin cancers. 5-fluorouracil is an analog of the pyrimidine uracil and thus acts as a pyrimidine antagonist. Common side effects of 5-fluorouracil include alopecia, dermatitis, anorexia, diarrhea, esophagitis, and heartburn. Serious side effects can include myelosuppression and cardiotoxicity.

RATIONALE:

Correct Answer:

- **Hepatic toxicity** - Hepatic toxicity is not a common side effect of 5-fluorouracil.

Incorrect Answers:

- **Diarrhea** - Diarrhea is a known common side effect of 5-fluorouracil.
- **Stomatitis** - Stomatitis is a known common side effect of 5-fluorouracil.
- **Alopecia** - Alopecia is a known common side effect of 5-fluorouracil.

TAKEAWAY/KEY POINTS:

Common side effects of 5-fluorouracil include diarrhea, stomatitis, and alopecia.

REFERENCE:

[1] BC Cancer Agency. Fluorouracil Monograph. BC Cancer. Published September 1994. Updated June 2023. http://www.bccancer.bc.ca/drug-database-site/Drug%20Index/Fluorouracil_monograph.pdf

[2] Canadian Cancer Society. Diarrhea. Updated April 2021. https://cancer.ca/en/treatments/side-effects/diarrhea#:~:text=Certain%20chemotherapy%20drugs%20are%20also,(Adrucil%2C%205%2DFU)

The correct answer is: Hepatic toxicity

Question 6

ID: 57876

Correct

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After his chemotherapy, LR calls to inform you that he has noticed an increase in his stool frequency from a baseline of 1 bowel movement per day to 3 and inquires if he should be concerned.

All of the following are appropriate recommendations **EXCEPT**:

Select one:

- Encourage him to increase his fluid intake to 10-12 cups of clear fluids throughout the day and to avoid spicy, deep-fried, and greasy foods ✖
- Start loperamide 4 mg followed by 2 mg every 2 hours or after each unformed stool (max daily dose: 16 mg) ✖
- Recommend LR to go to the emergency room immediately for further reassessment as they are demonstrating early signs of infection ✔

  Rose Wang (ID:113212) this answer is correct. LR is experiencing a mild increase in the number of bowel movements from baseline within a 24-hour period. It is not necessary to immediately refer to the emergency room at this time.
- Discontinue their scheduled psyllium ✖

Correct

Marks for this submission: 1.00/1.00.

TOPIC: Oncology

LEARNING OBJECTIVE:

To understand the common management principles of chemotherapy-induced diarrhea.

BACKGROUND:

Diarrhea can have many different causes and people with cancer often develop diarrhea as a result of chemotherapy treatment. The cells lining the gastrointestinal tract divide rapidly and as a result, can be easily damaged by chemotherapy. This makes the lining of the intestine thinner and unable to function properly, which can result in diarrhea. 5-fluorouracil is a chemotherapy agent known to cause diarrhea. Other known agents include irinotecan, methotrexate, docetaxel, and cisplatin amongst others. Management of chemotherapy-induced diarrhea can range from non-pharmacological measures such as dietary and lifestyle management to supportive care with medications such as loperamide. Lifestyle measures for diarrhea caused by cancer treatment include a low-fiber diet with reduced insoluble fibers (vegetable or fruit skins), reduced caffeine (tea, coffee, pop, energy drinks), reduced high-sugar beverages (juice, iced tea, pop), reduced gas-forming foods (broccoli, carbonated beverages), eating smaller more frequent meals, chewing one's food well and slowly, and drinking at least 8 to 10 cups of liquids every day. Red flag signs for chemotherapy-induced diarrhea requiring immediate medical attention include an increase of 4-6 stools per day over baseline or more, a fever ≥ 38 degrees Celsius, abdominal cramping, nausea and vomiting, sepsis, neutropenia, blood in stool, or dehydration.

RATIONALE:

Correct Answer:

- **Recommend LR to go to the emergency room immediately for further reassessment as they are demonstrating early signs of infection** - LR is experiencing a mild increase in the number of bowel movements from baseline within a 24-hour period. It is not necessary to immediately refer to the emergency room at this time.

Incorrect Answers:

- **Encourage him to increase his fluid intake to 10-12 cups of clear fluids throughout the day and to avoid spicy, deep-fried, and greasy foods** - Increased fluid intake and avoidance of foods that may trigger diarrhea are recommended.
- **Start loperamide 4 mg followed by 2 mg every 2 hours or after each unformed stool (max daily dose: 16 mg)** - The use of loperamide at higher doses such as 4 mg followed by 2 mg every 2 hours or after each unformed stool is recommended for chemotherapy-induced diarrhea.
- **Discontinue their scheduled psyllium** - Discontinuation of medications that are known to induce bowel movements is an appropriate response when patients are experiencing diarrhea.

TAKEAWAY/KEY POINTS:

The management of chemotherapy-induced diarrhea includes a combination of non-pharmacological measures, pharmacological measures, and a referral for immediate medical attention if necessary

measures, pharmacological measures, and a referral for immediate medical attention if necessary.

REFERENCE:

[1] Canadian Cancer Society. Diarrhea. Updated April 2021. https://cancer.ca/en/treatments/side-effects/diarrhea#:~:text=Certain%20chemotherapy%20drugs%20are%20also,(Adrucil%2C%205%2DFU)

[2] Gill S, Cashman R, Vander Meer L, et al. Symptom Management Guidelines: DIARRHEA. BC Cancer. Published January 2010. Updated October 2018. http://www.bccancer.bc.ca/nursing-site/Documents/4.%20Diarrhea.pdf

The correct answer is:
Recommend LR to go to the emergency room immediately for further reassessment as they are demonstrating early signs of infection

Question 7

ID: 57877

Correct

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Roughly 24 hours after your last phone conversation, LR calls to inform you that his diarrhea has persisted despite adhering to the recommendations that you had previously made for him, which included using loperamide at the maximum dose of 16 mg per day. He tells you that his last bowel movement 30 minutes ago had blood in it and he is having trouble with his fluid intake.

What is your recommendation for LR?

Select one:

- Continue with loperamide 2 mg after each loose stool until diarrhea resolves at home ✖
- Admit to the hospital and continue with loperamide 2 mg after each loose stool until the diarrhea resolves ✖
- Admit to hospital and start diphenoxylate-atropine in addition to loperamide ✖
- Admit to hospital and start octreotide ✔

Rose Wang (ID:113212) this answer is correct. For diarrhea requiring urgent medical attention such as the one LR is experiencing, octreotide is indicated.

Correct

Marks for this submission: 1.00/1.00.

TOPIC: Oncology

LEARNING OBJECTIVE:

To understand the common management principles of chemotherapy-induced diarrhea.

BACKGROUND:

Red flag signs for chemotherapy-induced diarrhea requiring immediate medical attention include persistent diarrhea that does not resolve with temperatures greater or equal to 38 degrees Celsius, abdominal cramping, nausea and vomiting, sepsis, neutropenia, blood in stool, or dehydration. Medications that may be indicated in the management of chemotherapy-induced diarrhea include loperamide, diphenoxylate-atropine, and octreotide. Loperamide and diphenoxylate-atropine may be used for mild chemotherapy-induced diarrhea individually or in combination but would not be expected to be sufficient for the management of severe chemotherapy-induced diarrhea. Octreotide diminishes diarrhea by acting directly on epithelial cells to reduce the secretion of pancreatic and gastrointestinal hormones such as VIP, serotonin, gastrin, secretin, and pancreatic polypeptide. It also prolongs intestinal transit time, intestinal absorption, and decreases the secretion of fluids and electrolytes.

RATIONALE:

Correct Answer:

- **For diarrhea requiring urgent medical attention such as the one LR is experiencing, octreotide is indicated.** - For diarrhea requiring urgent medical attention such as the one LR is experiencing, octreotide is indicated.

Incorrect Answers:

- **Continue with loperamide 2 mg after each loose stool until diarrhea resolves at home** - Loperamide beyond a maximum dose of 16 mg per day is not shown to be more efficacious and LR has red flag signs requiring hospitalization.
- **Admit to the hospital and continue with loperamide 2 mg after each loose stool until the diarrhea resolves** - Loperamide beyond a maximum dose of 16 mg per day is not shown to be more efficacious and would unlikely provide additional benefit for LR.
- **Admit to hospital and start diphenoxylate-atropine in addition to loperamide** - Diphenoxylate atropine may be a useful adjunct agent alongside loperamide but not for serious diarrhea such as the one LR is experiencing.

TAKEAWAY/KEY POINTS:

The management of serious chemotherapy-induced diarrhea should include the use of octreotide.

REFERENCE:

[1] Canadian Cancer Society. Diarrhea. Updated April 2021. https://cancer.ca/en/treatments/side-effects/diarrhea#:~:text=Certain%20chemotherapy%20drugs%20are%20also,(Adrucil%2C%205%2DFU)

[2] Gill S, Cashman R, Vander Meer L, et al. Symptom Management Guidelines: DIARRHEA. BC Cancer. Published January 2010. Updated October 2018. http://www.bccancer.bc.ca/nursing-site/Documents/4.%20Diarrhea.pdf.

[3] Shah A. BCCA Guidelines for Management of Chemotherapy-induced Diarrhea. BC Cancer. Published October 14, 2004. http://www.bccancer.bc.ca/nursing-site/Documents/GuidelinesforManagementofCID.pdf.

The correct answer is:
Admit to hospital and start octreotide

Question 8

ID: 57897

Incorrect

Flag question

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All of the following are true regarding hemorrhagic cystitis, **EXCEPT:**

Select one:

- Hemorrhagic cystitis commonly occurs as a side effect of ifosfamide and sunitinib ✔
- Bladder irrigation, intravenous hydration with diuresis, hyperhydration, and the administration of mesna are all strategies to reduce the incidence of cystitis ✖
- Patients should be counseled to ensure adequate hydration and to void frequently post-chemotherapy ✖
- Hemorrhagic cystitis can develop within a few hours or be delayed several weeks ✖

Rose Wang (ID:113212) this answer is incorrect. It is possible for hemorrhagic cystitis to develop within a few hours or be delayed by several weeks.

Incorrect

Marks for this submission: 0.00/1.00.

TOPIC: Oncology

LEARNING OBJECTIVE:

To understand the preventative measures and management strategies for hemorrhagic cystitis.

BACKGROUND:

Hemorrhagic cystitis is a side effect of chemotherapies such as cyclophosphamide and ifosfamide where their active metabolite, acrolein, irritates the lining of the bladder. Hemorrhagic cystitis can develop within a few hours or be delayed by several weeks. Prophylactic measures include encouraging patients to drink plenty of fluids during therapy, to void frequently, and to avoid taking the drug at night. Mesna is a drug that helps reduce the risk of hemorrhagic cystitis by binding to and inactivating the irritant acrolein in the bladder. Treatment of hemorrhagic cystitis includes discontinuation of the offending agent, hyperhydration, bladder irrigation, or agents that stimulate platelet aggregation to cause local vasoconstriction.

RATIONALE:

Correct Answer:

- **Hemorrhagic cystitis is not a known side effect of sunitinib.** - Hemorrhagic cystitis is not a known side effect of sunitinib.

Incorrect Answers:

- **Bladder irrigation, intravenous hydration with diuresis, hyperhydration, and the administration of mesna are all strategies to reduce the incidence of cystitis.** - Bladder irrigation, intravenous hydration with diuresis, hyperhydration, and the administration of mesna are all strategies to reduce the incidence of cystitis.
- **Patients should be counseled to ensure adequate hydration and to void frequently post-chemotherapy.** - Patients should be counseled to ensure adequate hydration and to void frequently post-chemotherapy.
- **Hemorrhagic cystitis can develop within a few hours or be delayed several weeks.** - It is possible for hemorrhagic cystitis to develop within a few hours or be delayed by several weeks.

TAKEAWAY/KEY POINTS:

Agents such as cyclophosphamide and ifosfamide can cause hemorrhagic cystitis. Preventative measures, as well as management strategies, exist to minimize the incidence of hemorrhagic cystitis.

REFERENCE:

[1] BC Cancer Agency. Cyclophosphamide Monograph. BC Cancer. Published September 1994. Updated June 2013. http://www.bccancer.bc.ca/drug-database-site/Drug%20Index/Cyclophosphamide_monograph_1June2013_formatted.pdf

[2] BC Cancer Agency. Ifosfamide Monograph. BC Cancer. Published September 1994. Updated June 2010. http://www.bccancer.bc.ca/drug-database-site/Drug%20Index/Ifosfamide_monograph_1June2010_formatted.pdf

The correct answer is:
Hemorrhagic cystitis commonly occurs as a side effect of ifosfamide and sunitinib

Question 9

All of the following are true regarding infusion reactions in chemotherapy, **EXCEPT**:

ID: 57886

Not answered

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Select one:

- Medications such as dexamethasone, hydrocortisone, diphenhydramine, and famotidine may be used to prevent infusion-related reactions in patients who have previously experienced a reaction ✖
- Fever greater than 40 degrees Celcius is an indication to stop an infusion and notify a physician ✖
- All infusion reactions should be managed by infusion interruption or cessation to prevent the risk of serious reactions such as anaphylaxis ✔
- Infusions do not need interruption or intervention if they are mild in nature ✖

TOPIC: Oncology

LEARNING OBJECTIVE:

To understand the prevention and management of infusion reactions during chemotherapy.

BACKGROUND:

An infusion-related reaction is defined as an adverse sign or symptom occurring during drug infusion or within the first day of drug administration. Infusion-related reactions include hypersensitivity or allergic reactions such as anaphylaxis (antibody-mediated), or anaphylactoid reactions (not antibody-mediated) such as cytokine-release syndrome. Reactions may include urticaria, dyspnea, bronchospasm, angioedema, hypotension, tachycardia, and back or abdominal discomfort/pain. Occasionally cardiorespiratory arrest may occur. Signs and symptoms of a mild-transient reaction include mild flushing, chills, dizziness (not interfering with activity), pruritus (mild or localized), or transient rash (covering less than 10% BSA with or without symptoms). In this situation, infusion interruption or intervention may not be indicated and the patient may instead be closely monitored for clinical signs of deterioration. Severe infusion-related reactions such as a severe rash (covering over 30% BSA with or without symptoms), hypoxia, edema/angioedema, dizziness (severe unsteadiness), uncontrolled hypotension (more than 20 mmHg drop from baseline), or a fever greater than 40 degrees Celsius must be acted on by stopping the infusion, informing the physician and administering treatment based on the local protocol. This typically includes diphenhydramine, epinephrine, and bronchodilators such as salbutamol or ipratropium depending on the clinical context.

RATIONALE:

Correct Answer:

- **All infusion reactions should be managed by infusion interruption or cessation to prevent the risk of serious reactions such as anaphylaxis** - This is not true as mild-transient reactions such as mild flushing, chills, dizziness (not interfering with activity), pruritus (mild or localized), or transient rash (covering less than 10% BSA with or without symptoms) do not require the therapy to be stopped.

Incorrect Answers:

- **Medications such as dexamethasone, hydrocortisone, diphenhydramine, and famotidine may be used to prevent infusion-related reactions in patients who have previously experienced a reaction** - Dexamethasone, hydrocortisone, diphenhydramine, and famotidine are medications that may be used to pre-medicate infusion-related reactions.
- **Fever greater than 40 degrees Celcius is an indication to stop an infusion and notify a physician** - Severe infusion-related reactions include severe rash (covering over 30% BSA with or without symptoms), hypoxia, edema/angioedema, dizziness (severe unsteadiness), hypotension (more than 20 mmHg drop from baseline), and a fever greater than 40 degrees Celsius. The infusion should be stopped and the physician informed.
- **Infusions do not need interruption or intervention if they are mild in nature** - Mild-transient reactions such as mild flushing, chills, dizziness (not interfering with activity), pruritus (mild or localized), or transient rash (covering less than 10% BSA with or without symptoms) may not require infusion interruption/discontinuation.

TAKEAWAY/KEY POINTS:

Management of infusion-related reactions due to chemotherapy may range from no immediate intervention and close monitoring to immediate cessation of an infusion and administration of medications.

REFERENCE:

[1] Anderson H. BC Cancer Protocol Summary for Management of Infusion-Related Reactions to Systemic Therapy Agents. BC Cancer. Published December 2005. Updated April 1, 2023. http://www.bccancer.bc.ca/chemotherapy-protocols-site/Documents/Supportive%20Care/SCDRUGRX_Protocol.pdf.

The correct answer is: All infusion reactions should be managed by infusion interruption or cessation to prevent the risk of serious reactions such as anaphylaxis

Question 10

ID: 57898

Not answered

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SR is a 36-year-old woman with refractory chronic lymphocytic leukemia who has recently started on a new chemotherapy agent. She presents to the emergency department after feeling unwell for the past 24 hours following her first treatment cycle. Her bloodwork panel returns elevated potassium, phosphate, and uric acid levels. Her serum creatinine is now 150 mmol/L from a baseline of 40 mmol/L.

What is the most appropriate management strategy?

What is the most appropriate management strategy?

Select one:

- Initiate allopurinol 100 mg PO daily ✖
- Initiate furosemide 20 mg PO BID ✖
- Fluid restriction to less than 1.5 liters per day ✖
- Initiate IV fluids and rasburicase 0.15 mg/kg once daily x 7 days ✔

TOPIC: Oncology

LEARNING OBJECTIVE:

To recognize the clinical presentation of tumor lysis syndrome and its initial management.

BACKGROUND:

Tumor lysis syndrome is an oncological emergency caused by massive and rapid tumor cell breakdown, leading to electrolyte and metabolic abnormalities like hyperuricemia, hyperkalemia, hyperphosphatemia, and hypocalcemia. If not treated promptly and appropriately, it can lead to acute kidney injury, cardiac arrhythmias, seizures, and even death. Aggressive intravenous (IV) hydration and diuretics should be provided to maintain urine output during tumor lysis syndrome. Rasburicase, a recombinant urate-oxidase enzyme, converts uric acid to an inactive and soluble metabolite and can be used to manage the high levels of uric acid which build up when tumors break down during tumor lysis syndrome. The inert and inactive molecule is then rapidly excreted in the urine and eliminated from the body.

RATIONALE:

Correct Answer:

- **Initiate IV fluids and rasburicase 0.15 mg/kg once daily x 7 days** - Rasburicase is effective in the management of hyperuricemia in tumor lysis syndrome by converting uric acid to an inactive and soluble metabolite which is then excreted in the urine and eliminated from the body.

Incorrect Answers:

- **Initiate allopurinol 100 mg PO daily** - Allopurinol can be used in the prevention of tumor lysis syndrome at doses of 300 mg but is not the drug of choice during the acute management of tumor lysis syndrome.
- **Initiate furosemide 20 mg PO BID** - While furosemide has a role in the management of tumor lysis syndrome, a dose of 20 mg oral furosemide is unlikely to be of benefit.
- **Fluid restriction to less than 1.5 liters per day** - Fluid restriction has no role in the management of tumor lysis syndrome.

TAKEAWAY/KEY POINTS:

Aggressive intravenous (IV) hydration and rasburicase are used for the treatment of tumor lysis syndrome.

REFERENCE:

[1] Gerrie, A, and Sehn L. BC Cancer Protocol Summary for Treatment of Relapsed/Refractory Chronic Lymphocytic Leukemia or Small Lymphocytic Lymphoma Using Venetoclax. BC Cancer. Published September 2019. Updated February 1, 2022. http://www.bccancer.bc.ca/chemotherapy-protocols-site/Documents/Lymphoma-Myeloma/ULYVENETO_Protocol.pdf

[2] Larson RA, Pui CH. Tumor lysis syndrome: Prevention and treatment. UpToDate. Updated April 1, 2022. https://www.uptodate.com/contents/tumor-lysis-syndrome-prevention-and-treatment

The correct answer is:
Initiate IV fluids and rasburicase 0.15 mg/kg once daily x 7 days

Finish review